

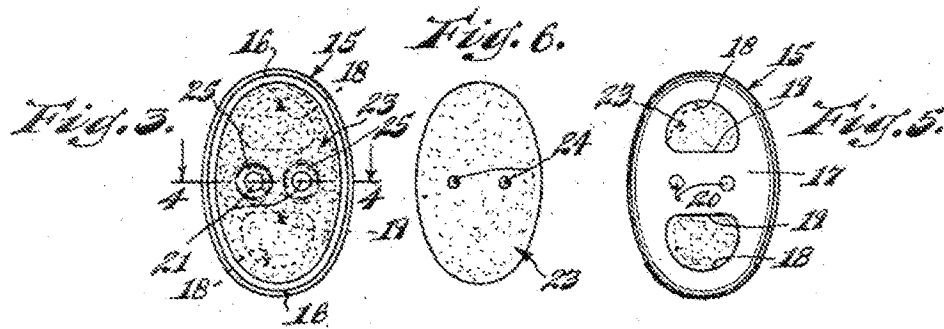
REMARKS

Claims 33, 35, 38, 57, 59 and 64-66 have been amended. No claims have been canceled. Thus, claims 33, 35-45, 44, 46, 44-50, 55-59, and 64-66 remain pending in this application.

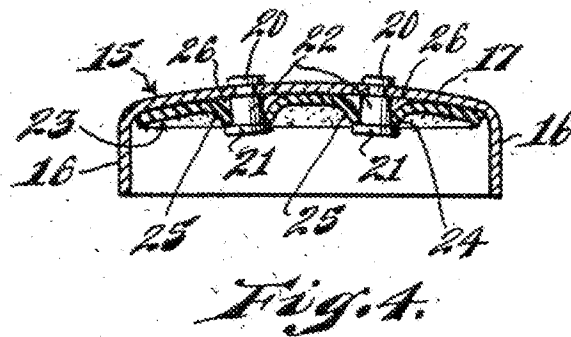
Claims 33, 39, 40, 44, 46, 49-50, 55-59, 64, and 65 have been rejected under 35 USC § 103(a) as being unpatentable over UK Patent Application GB 2,072,516 to Simpson et al. (Simpson) in view of the U.S. Patent 2,105,183 to Cover, and European Patent 0252890 to Söderberg. Applicants respectfully submit that this rejection cannot be sustained for the following reasons.

Firstly, an examination of these references as a whole, when taken in light of the historical exhalation valve development record, demonstrates that applicants' invention would not have been obvious to a person of ordinary skill.

The Cover '183 patent, dating back to 1938, is the first published patent in this group of references. Cover illustrates a centrally-mounted, dual-flap system where air is purged from the valve through openings **18** that are located on opposing sides of the central mounting position at stud pins **20**:

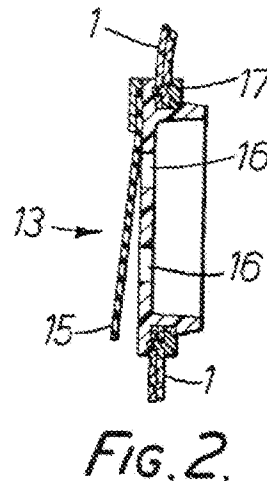


Cover indicates that by using pins **20** — which are larger than the apertures **24** in the flap material **23** — that the valve can be stretched or configured to form walls **25** that resemble cone-like members that assist in making the flap remain closed :



(see Cover at page 1, column 2, lines 44 to page 2, column 1, lines 1-7).

Many years after publication of the Cover '183 patent, Simpson developed the following flapper-style valve:



Like Cover, Simpson's valve has two openings 16 but the flap is mounted at one end.

Although Cover had been published for a number of years before Simpson filed his patent application in 1980, none of Cover's teachings regarding flap-mounting were used in Simpson's exhalation valve. Simpson recognized that there may be a valve leakage problem with his valve, but he did not attempt to solve this problem by using any of the features of the Cover valve.

Instead, Simpson described the use of an antechamber over the valve to accommodate leakage:

To prevent inhalation of harmful atmosphere owing to leakage of the or each valve, the valve may be provided with an antechamber so arranged that, if the valve does leak in operation, the wearer inhales previously exhaled breath and not the harmful atmosphere.

(see Simpson at page 1, lines 58-64).

Söderberg, also filed many years after Cover's publication, similarly did not employ any of Cover's teachings in dealing with issues of keeping its valve in a closed position. Söderberg instead taught the use of a beveled edge to keep its flapper valve pressed against the surface:

Figures 2 and 3 show views from above of the valve device according to the invention, with a valve membrane 11 fitted in the valve seat. The valve membrane is preferably made of compression-moulded rubber which fulfils the above-mentioned high requirements placed on protective masks. In compression-moulded state the rubber material is resilient and if the membrane is given a beveled edge 12 it will seal against the border 3 of the valve seat in closed position, irrespective of the position assumed by the valve device. Furthermore, the rubber material is so light that its weight will not open the valve unless influenced.

(See Söderberg at page 4, lines 12-23).

Thus, it is apparent that the cited art, when read as a whole, clearly did not appreciate that any of Cover's teachings could be used in a flapper-style valve to achieve suitable performance.

The inability of the art to employ any of Cover's teachings in flapper-style valves is further manifested in U.S. Patent 4,934,362 to Braun (published in 1987). Like Cover, Braun discloses a dual-flap system for an exhalation valve that is used on a respirator:

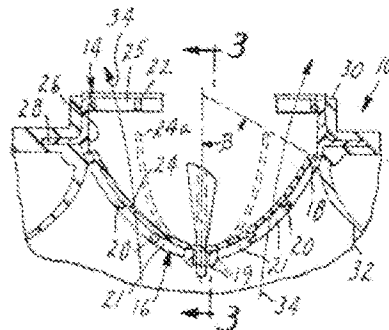


FIG. 2

This valve was commercialized by 3M after the Braun filing date. Thus, for nearly 50 years after Cover's publication, the prior art did not provide the appropriate structure for enabling a flapper valve to remain closed under any orientation when the mounting hardware is located at one end to create a greater moment arm for easier valve opening. The inability of the art to provide such

a valve over such a time period is good evidence of nonobviousness.¹ Neither Braun nor Cover, nor any of the other references of record, suggests the appropriate structure necessary to achieve such a benefit. In fact, Braun states that "if the flap is too long, it might not have sufficient resilience to become quickly seated and to resist extraneous unseating forces."² Therefore what the record fully demonstrates is that the prior art, up to the point of applicants' filing, did not recognize how to achieve the structure of applicants' invention — much less the benefits that it provides. The fact that Simpson and Söderberg, which were both published many years after Cover, taught different methods for dealing with leakage (Simpson's use of an antechamber and Söderberg's use of a flap with a beveled edge) both further demonstrate the nonobviousness of applicants' invention. And the additional fact that Braun continued to suggest the use of a dual flap system for an exhalation valve on a respirator in 1987, is yet further evidence of the nonobviousness of applicants' invention.

The Examiner indicates that Simpson's teaching of an antechamber, as a measure to prevent the breathing of a toxic gas, "is ideal motivation to modify Simpson with the teachings of Cover." If this were the case, however, then Simpson would have dispensed with the antechamber and would have mounted its flap using Cover's method. The provision of an antechamber requires additional parts and features and restricts air movement outside the valve. As such the complete Simpson valve would have been more complicated in structure and operation to prevent unwanted fluid influx. The fact that Simpson suggests (and uses) an inferior technique is evidence of nonobviousness; it is not motivating evidence that supports the contrary.³ Thus, Simpson cannot be properly cited as motivating evidence for arriving at applicants' invention.

Secondly, please also bear in mind, that at the time of applicants' invention, there was no suggestion that Cover's teachings could be successfully applied to Simpson or to Söderberg. That is, even if the certain teachings of Cover were particularly directed for use on the Simpson or Söderberg valves, there would have been no guarantee that a successful valve would have

¹ See *In re Ehringer*, 146 USPQ 31, 37, (CCPA 1965) ("Thus over 40 years elapsed in this art prior to appellant's filing date without anyone suggesting, so far as the art cited shows, a non-sag *thoriated* tungsten filament or any way of producing it.").

² See U.S. Patent 4,934,362 to Braun at column 3, lines 40-43.

³ See, e.g., *In re Dien*, 152 USPQ 550, 551 (CCPA 1967). ("[T]he mere existence...of an unsatisfactory process and the attendant incentive to seek improvement do not negative patentability.")

been created. As the Examiner is aware, "both the suggestion and the expectation of success must be founded in the prior art, not in the applicant's disclosure."⁴ Only applicants have provided the structure and conducted the testing necessary to demonstrate how to make a cantilevered valve that is capable of remaining closed under any orientation while also exhibiting a low pressure drop during use. As quoted above, Braun demonstrates that the prior art did not have such an expectation for success. These facts provide further evidence of non-obviousness.

Thirdly, applicants also are the only persons to demonstrate that such a valve can be created which exhibits superior performance, i.e., sufficiently lower airflow resistance force than a dual-flapper exhalation valve like that disclosed in Cover (see examples 4-6 of applicants' specification). These unsuggested beneficial results provide yet further evidence of nonobviousness.

Fourthly, the prior art references, even if combined as asserted in the Office Action, would not have led a person of ordinary skill to applicants' claimed invention. None of the cited references teach or suggest the provision of a seal ridge that terminates at a seal surface. In Cover, the base plate 17 represents the seal surface. There is no seal ridge. Similarly, in Simpson the valve seat represents the seal surface. Söderberg also does not provide a description of a seal ridge that terminates at a seal surface. Additionally, none of these references teaches or suggests how to support a single flexible flap at a flap-retaining surface that is located non-centrally relative to an orifice and operatively relative to the seal surface (which is located at the end of a seal ridge) such that the flap achieves an imposed curved profile from the point where the flap is supported on the valve seat to a second point where the free portion of the flap contacts the seal surface. Cover teaches a person of ordinary skill to make apertures 24 smaller in size than the mounting pins 20 to create a cone-like formation at the pins 20 to ensure good seating. Therefore, even if Cover was combined with Simpson or Söderberg, the combination would not have led a person of ordinary skill to applicants' invention. Additionally, the prior art does not teach or suggest how to support a single flexible flap at a flap-retaining surface non-centrally relative to the orifice and operatively relative to the seal surface such that the free portion of the flap is pressed towards the seal surface of the valve seat in a closed state of the exhalation valve under any valve orientation.

⁴ *In re Dow Chemical*, 837 F.2d 469, 473, 5 USPQ2d 1529, 1531 (Fed. Cir. 1988).

Finally, applicants' changes to the claims further distinguish their invention from the prior art. In the Office Action, the Examiner stated that "if the mounting system of Cover was moved slightly off-center, which most likely could be done without greatly affecting the performance of the valve, then it would no longer be centrally located." The Examiner further indicated that "once again, it is the office's position that the Examiner interprets all claims as broadly as possible" and that the claim limitation pertaining to the valve being non-centrally located did not "require the flap to be at one side of the valve system." Applicants have amended their claims to include a limitation (v) in claims 33 and 65 and a limitation (v)(i) in claim 66. This newly-presented limitation specifies that the *stationary portion of the flap extends from the point where the flap is secured to the valve seal to the periphery of the flap*. With this limitation, applicants' claims are further distinguished from a dual-flap system where the stationary portion is centrally located. Please also note that applicants' claims also spell out: (a) that there is a "single flexible flap" not a dual-flap system, (b) that "the free portion of the flexible flap represents the only free portion of the flap", and (c) that "the stationary segment of the flap periphery [is located] opposite at least part of the free segment." These limitations, taken together, clearly distinguish applicants' invention over the centrally-mounted, dual-flapper system described in Cover, whether taken alone or in combination with the other references.

For the above reasons, applicants believe that the present claims are in condition to be allowed. Please reconsider the outstanding rejections in light of the claim amendments and comments provided above.

Respectfully submitted,

July 9, 2007

Date

By:

Karl G. Hanson, Reg. No.: 32,900

Telephone No.: 651-736-7776

Office of Intellectual Property Counsel
3M Innovative Properties Company
Facsimile No.: 651-736-3833